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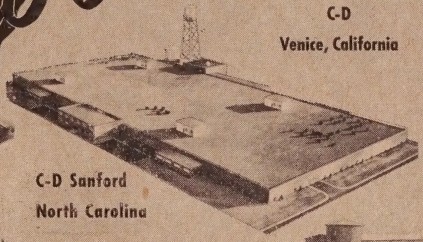

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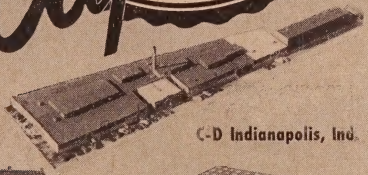

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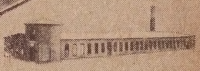

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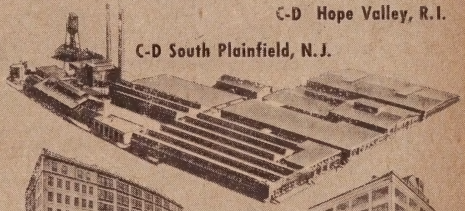

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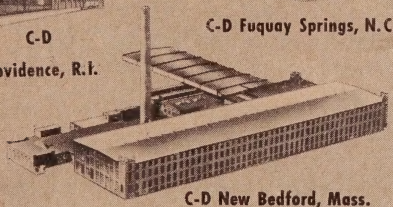

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Vol. 21 FEBRUARY, 1956 No. 2

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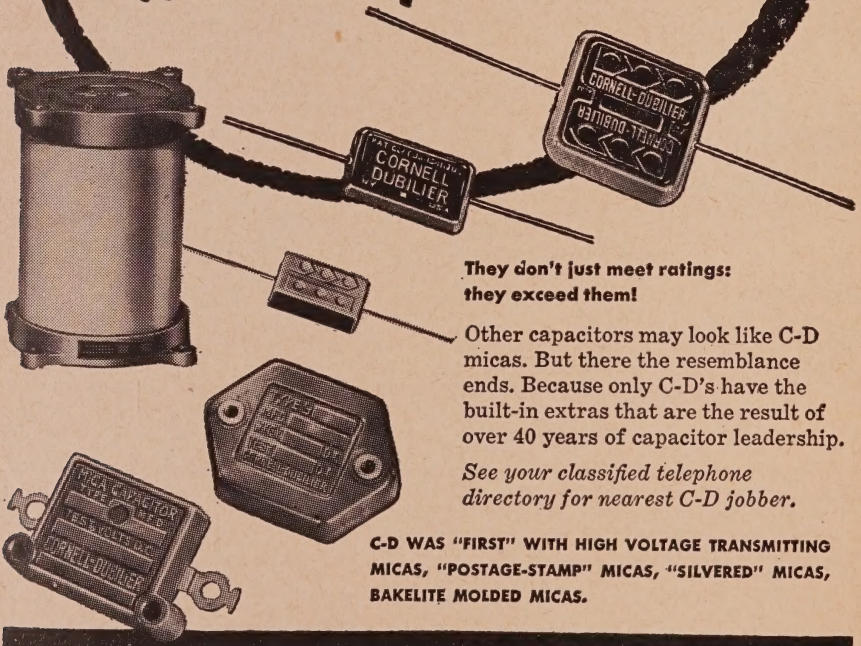

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BATTERY-OPERATED, DIRECT-READING AUDIO-FREQUENCY METER

A direct-reading, electronic audio frequency meter indicates unknown frequencies on a meter scale. Requiring no adjustments or manipulations, except the switching of ranges, it possesses all of the simplicity of a common voltmeter or ammeter. An instrument of this type will measure frequencies over a wide range and its frequency indications are unaffected by the voltage or waveform of the applied signal within wide limits.

In many practical applications, the frequency meter is superior to the use of Lissajou's patterns in that it requires no auxiliary instruments such as an oscilloscope or audio oscillator, demands no special operating skills, and can be used to observe a rapidly-fluctuating frequency which would be difficult if not impossible to follow with Lissajou's figures. Unlike simple, movable-coil frequency meters, the electronic frequency meter has high input impedance and accordingly imposes virtually no load upon the frequency source.

The electronic frequency meter described in this article covers 10 cycles to 100 kc in four ranges: 0-100 (measurements below 10 cycles not recommended in this range), 0-1000, 0-10,000, and 0-100,000 cycles at full-scale deflection of the meter. The readings are presented on the scale of a 0-1 d-c milliammeter, the response being entirely linear. Thus, a reading of 0.1 ma indicates a frequency of 10, 100, 1000, or 10,000 cycles, depending upon the range selected, but in any event always 1/10 of the full-scale frequency. The frequency indication does not change with signal voltage as long as the voltage is between 3 and 175 volts. Shifts occur only when the frequency changes. The input impedance corresponds to 0.1 microfarad in series with 0.27 megohm.

Operating Principle

The electronic frequency meter operates on this simple principle: If a succession of pulses having the same polarity and constant amplitude are passed through a d-c milliammeter, the meter deflection is proportional principally to the pulse frequency. The meter response under these conditions is linear, and so only one point on the scale need be calibrated. The purpose of the electronic circuit ahead of the meter is to convert the signal of unknown frequency into pulses of that frequency suitable for presentation to the milliammeter. Changing the value of the coupling capacitor at the input of the meter circuit simultaneously with a meter shunt resistor changes the frequency range of the instrument.

The instrument circuit receives the unknown signal which may be sinusoidal or non-sinusoidal (e.g., square-wave, sawtooth, etc.) and first converts it into an essentially rectangular wave. This rectangular wave then is differentiated by C and R elements in the metering circuit into positive and negative pulses. Finally, a rectifier selects only the negative pulses which then are passed through the milliammeter.

Instrument Circuit

The foregoing explanation now may be applied to the instrument circuit given in Figure 3. This circuit is seen to consist of a 2-stage RC-coupled amplifier capacitance-coupled to the meter circuit.

As long as the input signal voltage is 3 v. or higher, the 1U4 tube is overdriven and saturates. The resulting hard clipping squares off the negative half-cycle of amplified signal voltage in the 1U4 plate circuit. The amplified positive half-cycle overdrives the 3S4 tube, squaring the opposite

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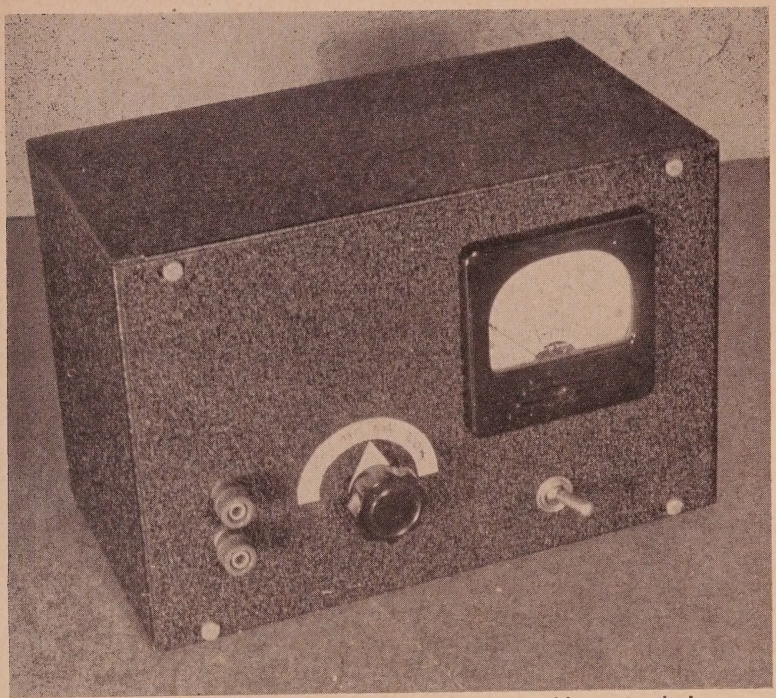

Fig. 1. The Completed Frequency Meter. Only the signal-input terminals, range switch, meter and ON-OFF switch appear on the front panel.

half-cycle in its plate circuit. Thus, the 3S4 output signal has both positive and negative half-cycles clipped cleanly at an amplitude which is independent of the input-signal amplitude. This quasi-rectangular signal is differentiated by the output coupling capacitor (C_7 to C_{10}) and the meter shunt resistor (R_8 to R_{11}) and is rectified by the diodes D_1 and D_2.

The frequency range covered by the meter scale is determined by the constants of the differentiating circuit. Thus, the range may be changed by switching simultaneously the coupling capacitor and meter shunt resistance. Capacitor C_7 and shunt resistor R_8 thus set up the 0-100-cycle range. The shunt resistors are rheostats which are pre-set during the initial calibration for full-scale deflection of the meter in response to calibrating signals at various frequencies.

Battery Operation

The circuit shown in Figure 3 has been adapted for battery operation from an ac-operated frequency meter circuit which appeared earlier in the literature.[1,2] Battery power gives complete portability, hum-free operation, freedom from stray coupling via the power line, and allows both signal input terminals to be operated above ground.

Battery operation is economical in this instrument. The requirements are 1½ volt at 150 ma and 90 volts at 11 ma. For ordinary, intermittent use, small-sized self-contained batteries are entirely adequate.

Construction

Figures 1 and 2 show constructional details of the frequency meter. Wide latitude is possible in the building, since the layout of the instrument is not at all critical and the reader can follow his own inclinations regarding mode of housing.

The instrument as shown in Figure 1 is housed in a metal box 9″ long, 6″ high, and 5″ deep. Only the ON-OFF switch (S_1 - S_2), signal input terminals, range switch (S_3 - S_4), and indicating meter are mounted on the front panel.

Figure 2 shows internal construction of the instrument. The circuit proper is enclosed in a small chassis box 5″ long, 3″ wide and 3″ deep held to the front panel by means of the range switch bushing and the insulated signal-input binding posts. The calibration rheostats (R_8 to R_{11}) are mounted on the rear wall of this box and their shafts are visible in Figure 2. The tube sockets are mounted on the top of the box.

There is ample room in the case for the two batteries which are seen standing nearby in Figure 2. If the reader anticipates prolonged service periods, it will be advisable to employ a heavier-duty B-battery than the 90-volt Type N60 shown. Two slightly larger 45-volt, series-connected units can be fitted into the instrument case.

Because of the low current drain and the small battery tubes, the instrument runs cool and no need for louvers or air holes in the case has been evidenced.

In order to minimize battery drain, no pilot light has been included. The meter normally does not read in the absence of an input signal, so there is no clue that the instrument is running and the operator must assume responsibility for switching-off the batteries during idle intervals.

Initial Calibration

After construction is compleed and wiring is verified, the initial calibration may be made. Four accurately-known frequencies are required for

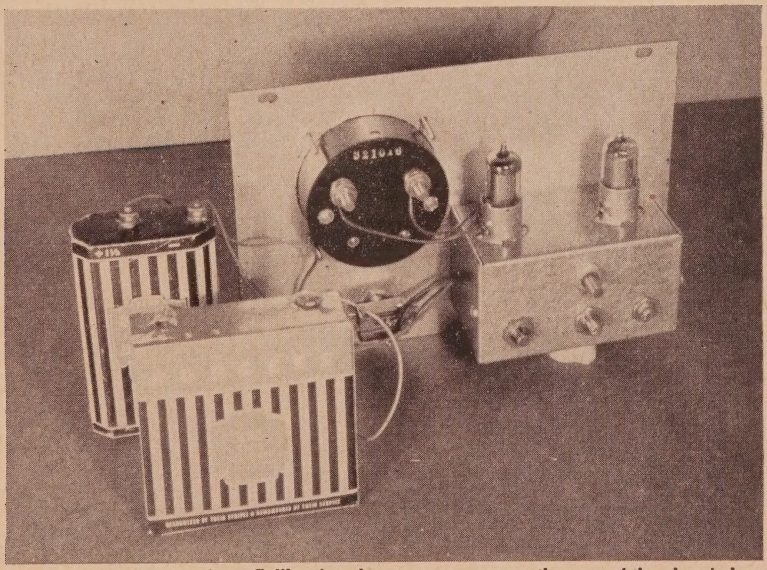

Fig. 2. Inside Construction. Calibration rheostats are seen on the rear of the chassis box.

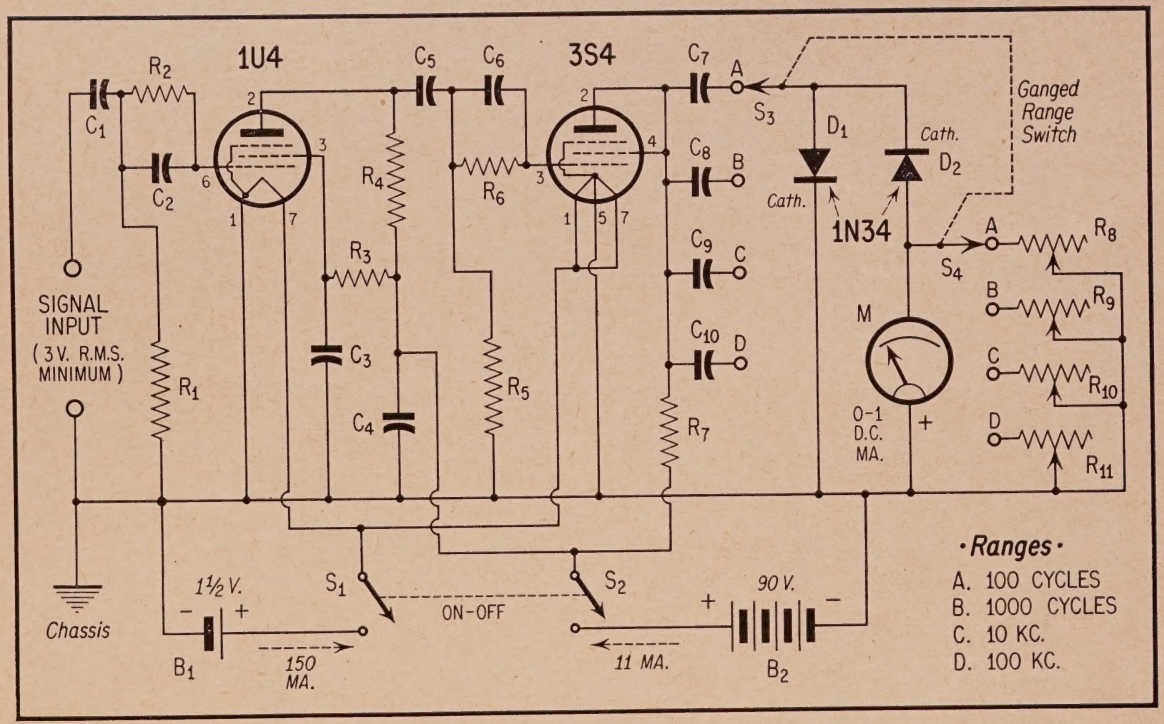

Fig. 3. Complete Circuit of the Audio Frequency Meter.

this purpose: 100 and 1000 cycles and 10 and 100 kc. The frequency source must supply at least 3 volts. A good audio oscillator will do for the first three frequencies. The fourth may be obtained from a 100-kc crystal oscillator.

Follow this procedure. (1) Remove the frequency meter temporarily from its case. (2) Connect the frequency source to the signal input terminals of the frequency meter. (3) Set the frequency source to 100 cycles and switch it on. (4) Set RANGE SWITCH S_3 - S_4 to its position A, and switch-on the frequency meter. (5) Adjust rheostat R_8 for exact full-scale deflection of the meter. Run the signal voltage up and down, noting that as long as it does not fall below 3 volts the meter reading does not change. (6) Set the frequency source to 1000 cycles. (7) Set RANGE SWITCH S_3 - S_4 to position B. (8) Adjust rheostat R_9 for full-scale deflection of the meter. (9) Set the frequency source to 10 kc. (10) Adjust rheostat R_{10} for full-scale deflection of the meter. (11) Set the frequency source to 100 kc. (12) Adjust rheostat R_{11} for full-scale deflection of the meter. (13) The calibration now is completed. Disconnect the signal source, switch-off the frequency meter, and re-install the latter in its case.

The intermediate points in any range may be checked by applying signals of various frequencies within the range and observing the meter deflection. For example, a signal frequency of 340 cycles should produce a meter deflection of 0.34 milliampere with switch S_3 - S_4 set to its position B. This linearity of the meter scale makes possible the use of a **single** calibrating frequency in each range, as described in the foregoing explanation of calibration.

Use of Instrument

Use of the instrument to measure frequencies is as simple as using a non-tube voltmeter to check voltage: (1) Set the range switch to its 100-kc position (position D). (2) Connect the frequency source to the signal input terminals. (3) Switch-on both the meter and the signal source. (4) Switch the meter successively to each lower range until deflection is obtained in the upper portion of the scale. (5) Read the unknown frequency from the meter deflection and range switch setting. Thus, a deflection of 0.93 ma with the range switch in position C indicates 9300 cycles.

PARTS LIST FOR FIGURE 3

B_1—1½-volt battery — Burgess 2FBP
B_2—90-volt battery — Burgess N60
C_1—0.1 ufd 200 v. miniature tubular — C-D CUB2P1
C_2—10 uufd mica — C-D 5W5Q1
C_3—0.01 ufd disc ceramic — C-D K082
C_4—0.1 ufd 200 v. miniature tubular — C-D CUB2P1
C_5—0.1 ufd 200 v. miniature tubular — C-D CUB2P1
C_6—10 uufd mica — C-D 5W5Q1
C_7—0.1 ufd 200 v. miniature tubular — C-D CUB2P1
C_8—0.01 ufd mica — C-D 1D3S1
C_9—0.001 ufd mica — C-D 1W5D1
C_{10}—0.0001 ufd mica — C-D 5W5T1
D_1, D_2—Germanium diodes—Sylvania 1N34
M—0-1 d-c milliammeter — Triplett 327-T
R_1—0.27 megohm 1 watt
R_2—100K ½ watt
R_3—1 megohm ½ watt
R_4—100K ½ watt
R_5—1.1 megohm ½ watt
R_6—0.27 megohm ½ watt
R_7—3900 ohms 1 watt
R_8, R_9, R_{10}, R_{11}—400-ohm, miniature, wire wound potentiometers — Mallory C400P
S_1 - S_2—Dpst toggle switch
S_3 - S_4—Miniature 2 - pole, 4 - position, non-shorting, single-gang, rotary selector switch — Centralab PA-1003

REFERENCES

1. **A Direct Reading Electronic Audio Frequency Meter,** Rufus P. Turner, RADIO & TELEVISION NEWS, February, 1951, p. 54.
2. BASIC ELECTRONIC TEST INSTRUMENTS, pp. 200-203, Rufus P. Turner, Rinehart & Co., Inc., New York, N. Y.

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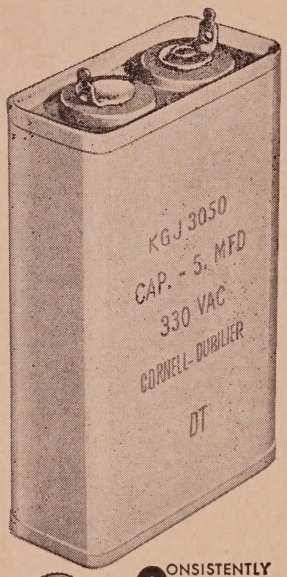

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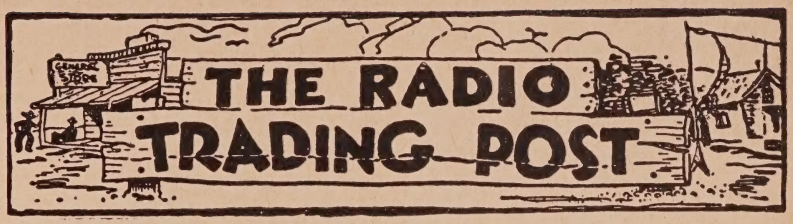

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WANTED — Electronic equip. Will trade guns and/or equip. for test equip., recorders, TV rcvrs., and other gear. Albert M. Grimes, 4925-2nd Ave. N., St. Petersburg 2, Fla.

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FOR SALE — Dumont 3" scope in good working order. Make offer. Pomis Electronics, 401 Schenectady Ave., Brooklyn 13, N. Y.

FOR SALE — Indicator Amp. CS-50AAZ with 21 tubes, 7 relays, 2 .5mfd/3kv. Cap., 4,500 v., resistors, condensors, etc., good cond., $14.50; Leece-Neville 6 v. 100 amp. generator, regulator, rectifier, $63. W. Hudson, 179 Steinmetz, Schenectady, N. Y.

WANTED — Complete modulator for Heath AT-1 xmitter. C. L. Stouth, Box 378, Secane, Pa.

WANTED — ARC-3, 8 channels, give price and cond. M. Colbert, 148 Chambers St., New York 7, N. Y.

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WANTED — Califone or DuKane record-master for 16" discs. or other if light and compact. Also 16" discs, recording amp. playback motor. Harvey White, 1105 Waller Ave., Winnipeg, Canada.

WANTED — Supreme 599A tube tester good; Channel Master Katy-B boosters, 7" or 10" TV's, all conditions; VEE-DX LLJ 12 and 10. Have 1925 Grebe, 2 tube (German) radios, both operating. Robert Beard, Box 516, Hayfork, Calif.

FOR SALE — Precision 10-54 tube tester; EV10S VTVM; E200 Eico VTVM with H.V. probe; Simpson VOM 260; 175 TV-radio tubes; Tube Caddy; Sams tube locator. Prefer local. P. T. Picket, 1585 Unionport Rd., New York 62, N. Y.

WANTED — Riders TV manuals. State cond. and price. Also swap radio mags for stamps. R. A. TenEyck, Garnerville, Rockland Co., N. Y.

FOR SALE — CK505 and CK507, l. n., Raytheon hearing aid tubes with long uncut leads. Make offer. Want good reliable tube tester. D. A. Faehnle, 1331 3rd. Ave., Columbus, Ohio.

SELL OR TRADE — NRI Radio and TV course with NRI multitester, less kits; Wurlitizer 30 w. juke box amplifier, 15" matching speaker, and volume control unit. Want cash or ham gear. F. R. Anderson, Box 1128, Bedford, Ind.

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FOR SALE — Rek-O-Kut RKD 16 recording turntable with new Hysteresis motor and Idlers; 16" astatic transcription pickup arm, crystal, all-groove needle. Best Offer over $130 or trade complete Philco 48-T-2500 projection TV chassis. Thomas R. Boddie, 9410 Pierpont Ave., Cleveland 8, Ohio.

FOR SALE — Unused Mon-Key Monitor and electronic key, $20 C. R. Peyton, 3375 Maple Ave., Zanesville, Ohio.

FOR SALE — Old copies "Capacitor": '38, Jan.-Feb.; '40, May to Aug.; '41, Jan. to Dec. (less Aug.); '42, Jan. to May and Nov.; '43, April; IRE proceedings, 1930 to 1955. R. N. Eubank, 1227 Windsor Ave., Richmond 27, Va.

FOR SALE — Recording tape, 1200 ft. on 7" reel in mailing carton, $2.50 postpaid. Loren K. Zoll, 417 E. Townley St., Bluffton, Ind.

SELL OR SWAP — Sectional tower 70', $50; electronic keyer, $23.50; 30 w. dual band xmitter with vibrapack power supply, $49.50; limiter amplifier RCA design, $35. F. D. Bornman, 19491 Lowell Dr., Detroit 3, Mich.

WANTED — Operating instructions for Simpson model 380 wavemeter-modulation indicator. Will buy or borrow, and photostat. Gil Sanford, 2145 Belfast St., Montgomery 6, Ala.

WANTED — Monitoradio model M-101, tuning range 152-163 mc. Earl Pfohl Studio, 11th and Central Ave., Anderson, Ind.

WANTED — Tube chart for Oak Ridge tube checker model 107, Rudolph Kase, 78 Primrose St., Rochester 15, N. Y.

FOR SALE — Halicrafters SX-42 rcvr. in good cond., complete with R-42 bass-reflex speaker and operating manual, 550 kc to 108 mc., AM and FM, $175 FOB. J. W. Stonecipher, 1610 W. John, Champaign, Ill.

TRADE — Rider "Public Address Equip." handbook and NRT Radio-TV Servicing and Communications course with multi-tester, for tape recorder or test equip. Herbert Piller, 749 Beck St., Bronx 55, N. Y.

SWAP — Radio-TV tubes, Precision VOM, Superior multitester, chemical lab. set for Hi-Fi tape recorder. Barbara Palmer, 245-10 62 Ave., Douglaston, Queens 69, N. Y.

FOR SALE — 12½" Motorola table model 12T2 TV, good cond., $16.95; "Emerson table model 663-B, $28.95. Will ship anywhere. Jones Radio Co., 1115 Rambler Ave., Pottstown, Pa.

FOR SALE — Precision E-200-C sig. gen., $40; Precision 10-20P tube and set tester, $75; Supreme model 574 VTVM, $25. All exc. cond. M. Rafayko, 180 Winston Ave., Lexington, Ky.

FOR SALE — Kohler light plant, 800 w. 115 v., 60 cy., 1. n., portable, cost $300, asking $175 or trade for good wide band scope, VTVM or Sams 11 to date. Walter K. Fralick, Rt. 1, Marion, Ky.

WANTED — Schematic and technical data on PE-120-B vibrator supply for BC-620 and BC-659. C. B. Kelly, 7204 Clovernook Ave., Cincinnati 31, Ohio.

WANTED — External roller chart box for Triplett 3212 tube tester; technical data for ARC-5 rcvr. and ARC-5 xmitter; back numbers of RCA "Ham Tips," 1955 ARRL handbook and mobile manual. F. Januss, 1542½ 2nd Ave., Los Angeles 19, Calif.

WANTED — Crystal calibrator and monitor type CGQ-60133 or Equiv.; Ferris or similar field strength meter, good standard typewriter, for cash or trade other gear or teletype machine. Murray Cohen, 2078 Wallace Ave., New York 62, N. Y.

SELL OR TRADE — Used test equip., 2½ and 6 v. power xformers, radio parts, speakers, etc. What have you? Anthony Pusateri, 1101 Fleming St., Coreopolis, Pa.

WANTED — FM mobile xmitter and rcvr. 30 to 50 mc.; base station; rcvr. and xmitter FM for 152-192 mc. mobile or 115 volts. James E. Anner, Hurley, N. Y.

FOR SALE — Collector's item: 52-vol. Sams' Radio and Phono Service data library. (Postwar models through May, 1948, edition never sold to servicemen.) Reasonable. D. Kellerman, 206-16 35th Ave., Bayside 61, N. Y.

SELL OR SWAP — Good used auto radios for Buick, Hudson, Chev., $12.50 each FOB. Want VFO for either Viking 2 or TBS50. Fisher Radio, 1385 H St. NE, Washington 2, D. C.

TRADE — Lazy 5 Q'er, BC-455 rcvr.; Brush tape recorder, commercial type, in portable case, with xtal mike and extension, perfect cond. for HQ129X or HQ140; binoculars. Louis D. Cinci, 204 Charter St., Clarksburg, W. Va.

SELL OR TRADE — Hammarlund "Comot Pro" short wave rcvr., $25; Radio City Product tube tester 322, $22 or trade for AM-FM or FM tuner. John P. McCullen, 3050 Bainbridge Ave., Bronx 67, N. Y.

FOR SALE — Hallicrafters, SX42 rcvr. or Collins 30J xmitter. Make offer. Leo Meister, 321 River Rd., Nutley, N. J.

SELL OR TRADE — NRI multimeter, 1. n., $10; Emerson 536 portable, good cond., $7 or trade for sig. gen. in good cond. Gib Trattner, 201 Baldwin Rd., Glassboro, N. J.

FOR SALE — Like new 1956 VM-700 Hi-Fi tape recorder, complete with mike, jacks, patch cord, reel and tape, $138. Jack Fives, 2916 Rockrose Ave., Baltimore 15, Md.

FOR SALE — Philco 7" TV, $8; GE 10" TV AM and FM, $20. Local only. Geo. Epstein, 200-27 46th Ave., Bayside 61, N. Y.

SELL OR TRADE — Zenith table model 7H918 FM rcvr., 7 tubes, best offer. Need signal tracer or 20,000 ohms per volt VOM. J. P. Janata, 2510 21st St., Astoria, L. I. C. 2, N. Y.

FOR SALE — Hi-Fi equip.; complete professional 3-speed tape recorder; Zenith transoceanic portable. Gary Gottlieb, Carnegie Inst. of Technology, Pittsburgh 13, Pa.

FOR SALE — Webcor tape recorder 210-1-D, $85; custom-built Preamp and Binaural head for same, $50; radio music transcription table, 33 1/3, 78 rpm, $40; Pickering 240DD cartridge, $40; Supreme 333 VOM analyzer, $12. A. R. Dayes, 29 Charles St., Merrick, N. Y.

SELL OR TRADE — Heath O-6 scope, A-1 cond., $35 or swap for Heath Intermodulation Analyzer, Impedance Bridge, or late model TV sweep generator. John G. Peters, 760-Yale Ave., Baltimore 29, Md.

SELL OR SWAP — National Schools radio course, consists of over 100 lessons, more than 10,000 pages, $30, or good scope. Howard Keller, 92 Ridge Terr., Neptune City, N. J.

FOR SALE — EMC model 120 VOM 20,000 DC - 10,000 AC resistance 0 to 300 meg., current up to 6 amps., 4½ meter, with papers and leads, exc. cond., $25. Walter Suita, 4011 Lawndal St., Detroit 10, Mich.

WANTED — Electrical blueprint reading with study guide by ATS. Wayne Sines, Rt. 1, Box 425, Oakland, Md.

SELL — Jackson 115 tube tester, $45; Simpson 315 sig. gen., $40. Want TV bar gen. Jess Ramey, R 3, Cadillac, Mich.

SELL OR TRADE — Heath AR2 (no cabinet) $20; Argus A-4 (1952) 35 mm camera, $25; or swap either for late model Heath VTVM. Britt Simons, Jr., 150 W. Washington Lane, Philadelphia 44, Pa.

FOR SALE — Radio News and Electronics magazines. 1950 thru 1955, all for $35. B. Walter, 179 Ranchitos Rd., San Rafael, Calif.

WANTED — Howard model 430 SW54, EC1, S38, AR-2 or small comm. rcvr. Have test equip. meters, Supreme manuals, or cash. J. Leach, Federal and Mulberry, Milton, Del.

SWAP — Electronic photoflash components and flash tubes (90 cents and up) for cheap scope or what have you? William Slack, 3716 Belmont Ave., Chicago 18, Ill.

FOR SALE — Like new Eico scope 5" model 400, $25; Heathkit AM sig. gen. model G1, $13. Walter Stutzbach, 169 Morton Blvd., Plainview, L. I., N. Y.

FOR SALE — Unused Eico sig. gen. model 320, $24.50; complete TV course by Magnavox, $15; books, l. n., on Radio and TV. L. E. Smith, R. 1, Trion, Ga.

FOR SALE — Globe Scout model 65, used only as second xmitter on 10 and 15 meters, $80. Calvin Wilson, 2507 Maplewood Rd, Richmond 28, Va.

FOR SALE — Back copies: Radio Electronics, Radio-TV News, Sam's P.F. Index, Successful Servicing, and NRI booklets, aircraft manuals. Send for complete list. Louis Porsetsky, 137-16 169th St., Jamaica 34, N. Y.

FOR SALE — Like new 6 v. xmitter and 115 v. rcvr. plus instructions for radio control of garage doors, 27-255 megacycles, $60; relay control box for garage door, $25. Alton L. West, 7 Evans Rd., Riverdale, N. J.

FOR SALE — Sylvania model 140 tube tester, with metal portable case, roll chart, test dial lights, noise, hearing aid tubes. A-1 cond. Make offer. Bertram's Radio Service, Concordia, Mo.

FOR SALE — Superior TV 11 tube tester, $30; Knight capacitor checker, $25 plus shipping. Both l. n. A. Delmarty, 142 Fir Ave., S. San Francisco, Calif.

FOR SALE — 12" radio speaker and power xformer for AC Dayton navigator radio; power xformers for Splitdorf E175 radio. Best offer. W. Lichtenberg, 316 So. Tacoma Ave., Tacoma 3, Wash.

FOR SALE — Two unused BTU-2 all-channel UHF conv Ultraverter, both for $50. Echement Television Service, 909 Brookline Blvd., Pittsburgh 26, Pa.

FOR SALE — Instructograph Code Teacher and 10 rolls tape, in exc. cond., $35. William J. Oakman, 2550 Bainbridge Ave., Bronx 58, N. Y.

SELL OR SWAP — Belgium Fabrique-Nationale 270 cal. rifle, l. n., for communications rcvr. like SX-28A, HQ-129X or NC-240 D. Clarence Cook, 124 Chestnut St., Medina, N. Y.

FOR SALE — Leece-Neville 6 v. system, 100 amp., complete with voltage regulator and rectifier, exc., $45; PE 103, $20; Marrow Tri-band, l. n., $30. S. Lieberman, 130-29-228th St., Laurelton, L. I., N. Y.

FOR SALE — Meissner analyst; RCA-UHF converter; Can-Marconi C-2 freq. meter; Motorola xmitter T69-20A with P.S.; Supreme model 563 Audio oscillator. Samuel Feller, 3109 Brighton 7th St., Brooklyn 35, N. Y.

SELL OR TRADE — Wilcox 602A commercial crystal controlled VHF comm. rcvr. for Measurements Corp. Type 78 or equivalent VHF sig. gen. Henry Gauntt, 850 Wren Ave., Miami Springs, Fla.

FOR SALE — National NC125 and speaker, exc. cond., $110 cash FOB. Carl D. Shpiar, Rt. 6 Stillwater Rd., St. Paul 9, Minn.

FOR SALE — Two 7" and one 10" TVs; Pontiac radio, fits 1941 to 1948 car; assorted radio tubes, cheap. Matthew Korecki, 4753 Garden St., Philadelphia 37, Pa.

FOR SALE — Tubes: 5687, 2K25, 807W; TV side mounts; 275/AR and 274/AR spring-loaded antenna insulators; two 276/AR and 8-MX 273/AR antenna insulators. Dick Platt, 213 Terraville Ave., Lead, S. Dak.

TRADE — 1,000 kc. crystal, accurate to 10 cycles in octal base, for 100 kc. crystal of comparable accuracy. Sell or trade complete DeForest radio course, 60 books and lessons, l. n. Dick Rogers, 28 Bellamy St., Boston 35, Mass.

WANTED — Discontinued model GE tone arm for single play microgroove, l. n. H. F. MacDonald, Box A-388, Kodiak, Alaska.

TRADE — $275 worth of "Cig-O-Mat" automatic automobile cigarette lighters, on display cards, FOB, for new or used electronic parts or equipment. Harry L. Boyer, 864 So. Weyant Ave., Columbus 13, Ohio.

TRADE — Disc recorder playback and cutting head, no amp. for used TV set, or scope. Emory Corron, 4096 Redonda La., Dayton 6, Ohio.

SWAP — Need grid dipper. Have RCA voltohmyst, Hickok AF gen., Superior tube tester, RMS bar gen., Speco sig. tracer-amplifier, Feiler stethescope. M. Bud, 635 E. 14th St., Apt. 11A, New York 9, N. Y.

FOR SALE — Riders manuals, Vols 1-5, and 6-17, A-1 cond. Best offer, or trade for equitable test equipment. Give model and make offer. Delta Electronics, Inc., Box 476, New Orleans 15, La.

FOR SALE — 1,500 genuine custom-built auto radios and any tubes, new or old. DeMarco Radio-TV Shop, 193 Pine St., New Haven 13, Conn.

FOR SALE — Radio and TV books: best offer, Coynes (5 editions); Ghirardi (3 editions); Fisher, Radio and TV Mathematics; Audel's Radioman's Guide; Rider's Superheterodynes; Boland and Boyce, Radio Data. Thomas Byrne, 331 Calhoun Ave., Bronx 65, N. Y.

SELL OR TRADE — Tubes: 3 ea. 4X150A, 5 ea. AX9903. Make offer. M. J. Rogan, 1121 Walnut St., Farrell, Pa.

WANTED — Sams photofacts. Write folder numbers, cond. and price. Howard P. Grant, 63 Sohier Rd., Beverly, Mass.

SELL OR TRADE — Tube and set tester, l. n.; sig. gen.; sig. tracer; battery charger, 6 and 12 volts; radio tubes, parts, and equip. Jack Grant, Coalgate, Okla.

WANTED — Navy RAL rcvr., Panadaptor any type, if frequency, 60 or 400 cycle and Lampkin 105 and 205 meters. Full description and price first letter. R. Kulmus, Westmoreland Rd., Whitesboro R.D., N. Y.

FOR SALE — Heath AT-1 xmitter and AC-1 antenna coupler, l. n., $38. C. Stouth, Box 378, Secane, Pa.

SWAP — Philco 12" table model TV, A-1 cond., for tube checker, will ship, pay half exp. E. McFarland, 1829 Walker St., Cincinnati 10, Ohio.

FOR SALE — TS-3 sweep gen.; SG-6 sig. gen.; AC-DC battery portable radio; 300 w. slide projector; lab. power supply; T-2 sig. tracer; 3" scope; V-6 VTVM; "Radio and TV Mathematics" book. Stanley Bombka, 8107 N. Odell Ave., Niles 31, Ill.

FOR SALE — Gonset tri-band, A-1 cond., with clipper, cables, plug, instruction book, $20. Ed Nicks, RR1, Box 169-C, Dubuque, Iowa.

WANT — Kit of 150 ½ w. new resistors, most needed sizes for servicing. Will swap $20, 3-D camera, flash and bag complete. S. O. Sellers, 2317 Ave. R-Ens., Birmingham 8, Ala.

WANTED — 152-164 mc. set. Have records, movie screen, film of war 2, 16 mm, small radio battery set. Harry Kuell, 18½ Thomas St., Newark 5, N. J.

WANTED — Antique ham gear, E. I. Co., Wm. B. Duck, Colin B. Kennedy, United Wireless, will transport within 200-mile radius; also old magazines and catalogs. Gene Harrison, 2410 Salerno Dr., Dallas, Tex.

FOR SALE — Radio control xmitter rcvr. and escapement for model plane or boat, for "License Free" 27.255 mc. citizen band, l. n., operating cond., less batteries, $29.95. R. Freeman, 2064 Ocean Pkwy, Brooklyn 23, N. Y.

SWAP — Complete course in fingerprinting with exams for disc recorder or tape recorder in perfect cond. J. Marston, Box 333, Hampton, N. H.

TRADE — ATR 6-12 v. AC to DC power supply for books, equip., etc., of like value. W. W. Wallace, Clarkton, N. C.

FOR SALE — Heath year-old FM-2 tuner (FM), exc. cond., $20. Anthony J. Tiso, 15 Pease St., Mount Vernon, N. Y.

FOR SALE — Complete Heathkit CW station, AT-1 xmitter, VF-1 VFO, AC-1 antenna coupler, Hallicrafters S-19 R Sky Buddy rcvr. with BFO, AVC, pitch control, send-rcvr. switch, also new speaker and tubes. All A-1 cond. John Strazza, Jr., 48 Pulaski St., Bloomfield, N. J.

FOR SALE — Eico 315 DeLuxe sig. gen., $20; Sprague Kwik-test KT1, with instructions, $18. Andy's TV and Radio Service, 13 North St., Schenectady, N. Y.

FOR SALE — 215 Sams Photofacts, $160; Precision ES-500A scope, $110; Bell RT-65B tape recorder, $75; Oak Ridge 104 syncro sweep gen., $20. All in exc. cond. D. Greenwood, 62 Summit Ave., Athol, Mass.

FOR SALE — Riders TV manuals 1-12 with index, exc. cond., $120 plus postage; McMurdo Silver 911 sweep gen. in working condition, needs calibrating, $30. Neches Radio and TV, 1105 Block St., Pt. Neches, Tex.

FOR SALE — Sonar VFX-680 all band exciter and VFO in cabinet; complete 60 w. CW xmitter, 120 w. final amplifier, 21" rack. Melvin Nesselroth, 255 Columbia Ave., Irvington 11, N. J.

FOR SALE — Heath TC-2P tube checker with CRT test adapter, l. n. First $25 takes it. Redd's Radio & TV Service, Box 12, Union Furnace, Ohio.

FOR SALE — RCA WR-59C sweep gen. and TV WR-39C calibrator, l. n., both, $260; Sams Photofacts, volumes 1-23, $240. All for $450. Henry Yoshimoto, 11865 Aneta St., Culver City, Calif.

WANTED — 21" and 24" rectangular TV chassis; VTVM; 8" or 10" table saw. Clarence F. Steier, 1000 Rosemary Dr., Louisville 13, Ky.

FOR SALE — Heathkit TS-4 TV sig. gen. and Shure No. 815 tape recording head. Never used, best offer. K. S. Ferrin, 485 S. Main, Miamisburg, Ohio.

FOR SALE — 839B, $5; 813, $7.50; Gonset 10-meter conv., $12; DM-65 dynamotor, $12; BC-453 converted at power supply, $12; BC-455 and BC-458 conv., $6 each. Other items. A. J. Arnold, 2028 Crockett, Amarillo, Tex.

SELL OR TRADE — Radio and TV News from March 1953; Radio-Electronics from October 1953; Proceedings IRE from July 1949, all to date; Service, Oct. 1949-Dec. 1951. Thomas H. Magee, Box 7854, Wright-Patterson AFB, Ohio.

SELL OR TRADE — 5527 RCA camera tube; Elliott automatic addressing machine; Supreme audolyzer 562. Slim's TV, 2025 Sunkist, Waukesha, Wis.

FOR SALE — 100 8 mc. crystals in FT243 holders for use in Communicator or similar equip., frequencies throughout 144-148 mc. band, 50 cents each or 10 for $4. G. W. Carter, 8015 Loyola Blvd., Los Angeles 45, Cal.

FOR SALE — SX28A rcvr.; Lysco 600 xmitter; 300 w. modulator; power supply 1500 v. at 300 mils; ARC5 2-meter xmitter with modulator; Tecraft 2-meter converter. Make offer. C. J. Price, 466 High St., Lockport, N. Y.

FOR SALE — BC-654A xmitter-rcvr. from radio set SCR-284-A, complete with PE-103-A, T. M. 11-275, all cables, T-17 mic, Key J-48, l. n. Best offer. Exp. Collect. A. Hawkes, 10 Hardy Rd., Westbrook, Me.

WANTED — Tubes — xmitting, receiving, special-purpose, TV. Prefer boxed (may be nested), standard brands. Cash or swap for tubes or equip. Mack O. Santer, 56 Crosby St., New York 12, N. Y.

WANTED — Replacement armature for PE-103-A dynamotor, or complete dynamotor, less filter base. State price. William Muessig, R. 2, Box 101, Aurora, Ore.

FOR SALE — Tung-Sol 5881 and 6550 tubes, also Masco tape recorder. R. Spera, 37-10 33rd St., Long Island City, N. Y.

FOR SALE — Dumont 224A scope, $70; Eico 425 scope, $33. S. S. Brody, 211-10 73rd Ave., Flushing 64, N. Y.

FOR SALE — Harvey-Wells TBS50D and APS50 supply, extra TVI'ed Harvey Wells cabinet, many extras; Sonar XE-10, 400 v. 200 ma. components. Sell all or singly. Local only, will not ship. G. Samkofsky, 264 Division Ave., Brooklyn 11, N. Y.

SELL OR TRADE — Precision E-200 sig. gen.; GE 200 sig. gen.; Philco 7051 tube tester; Waterman 10-A scope; Weston 772 VOM. Reasonable, or trade for commercial ham gear. Paul Bugg, 1206 E. First, Rosewell, N. M.

SWAP — Fishing lures (flies, poppers, jigs, spoons, plugs) for inexpensive table radio, radio or TV tubes or filter condensers. James C. Eubanks, c/o Chem Engr. Dept., Univ. of Tenn., Knoxville, Tenn.

SELL OR TRADE — American Beauty soldering iron, 220 v., 130 w., $4.50; RMS and Anchor Booster, $15 each; radio and TV tubes. Need 1/4" electric drill and other tubes. Andrews, 740 Maple St., Bethlehem, Pa.

WANTED — Power supply for BC-669. State price and condition. F. S. Durham, P. O. Box 384, Harrisburg, Ark.

SWAP — Geiger counters or scintillators, all types, for spring-drive strip paper recorder with a one M.A. pen movement, or any substitute, also recorder for use with drill hole counter, or cash. James L. Simpson, 1001 Walnut, Couer D'Alene, Idaho.

WANTED — Microwave xmitting tubes, Klystrons, Magnetrons and Wave Guide. Send list and prices. M. A. Irizarry, 427 E. 164th St., New York 56, N. Y.

FOR SALE — Motorola FMTRU (A) mobile xmitter-rcvr., 150 mc., $35; GE-Mobile xmitter-rcvr. 25 to 40 mc., $40. Ralph Villers, Box One, Steubenville, Ohio.

FOR SALE — SX28A rcvr., very good cond., recently aligned and overhauled. Uses HQ129X noise silencer and SX42 Hi-Fi audio, $150. Joseph F. Dineen, 9 Winter Terr., Westwood, Mass.

WANTED — Used 17" or 21" TV table model in working cond. W. Woolems, Box 136, Ancon, Canal Zone.

WANTED — Transmitting, receiving and special-purpose industrial type tubes, i.e., Klystrons; Hickok tube checkers; variacs. Cash or swap for choice equip. and tubes. B. N. Gensler, 330 West 11th St., New York 14, N. Y.

SELL OR TRADE — BC639 rcvr., 100-160 mcs., single dial control, 110 v. AC, $35; Eico sweep gen. 360K, factory wired, $32; panadaptor Hallicrafters SP44, $45. Want 813 or 810 tubes. R. Brandt, 221 Newman Springs Rd., Red Bank, N. J.

SWAP — Complete 1. n. Kodak Medalist I outfit, including portra and telek lenses, for high quality tape recorder. Macy, 2346 Dundee, Louisville, Ky.

BUSINESS FOR SALE — Well established electronics parts supply house. Large following. Exc. location. J. Vern Williams, Smith Tower, Seattle 1, Wash.

FOR SALE — National HRO 5RA1 coils and power supply: Turner 211 microphone; LM-13 freq. meter with mod; BC-348-C with 115 v. built in supply; General Radio 724A Field strength meter 16 kc. to 50 mc., 1. n. N. K. Stover, 1357 Hill St., York, Pa.

FOR SALE — Frequency modulator Fada model 795, $12 FOB. R. A. Reid, Parkersburg, Iowa.

WANTED — Coin-operated radios. Allen's Radio Shop, 250 River Ave., Holland, Mich.

FOR SALE — Simpson tube tester, No. 1000, used very little, guaranteed good cond., $75; Sams 1-30 with binders, $20; HV power xformers, civilian aircraft rcvrs. and parts. W. R. Farrall, 111 18th. St. SE, Rochester, Minn.

SWAP — 8 mm movie camera, with built in light meter and carrying case, for 2-meter transceiver, in working cond., must be able to reach 148.14 mg. Jay Lyon, 7220 Garland Ave., Takoma Park 12, Md.

FOR SALE — 5TP4 projection TV tube, 1. n., $10; Picket and Eckel model 1010 slide rule, $6. John Kozlowski, 327 Montgomery St., Jersey City, N. J.

FOR SALE — Edwards FM tuner, $20; Hickok T 53 tube tester, rebuilt for late tubes, $15; Feiler TS2 sig. tracer analyzer, $12.50. George W. Riddle, 15 George St., Milford, N. H.

FOR SALE — Precision scope, sig. and sweep gens.; Master VTVM; battery eliminator; AC convertor; other test equip. R. L. Blake, 1340 N. Ridge Rd., E., Lorain, Ohio.

FOR SALE — Triplett TV-FM sweep gen. marker, type 3434-A. Perfect cond., $150 or best offer. Paul R. Colby, 616 Greenwich St., Falls Church, Va.

FOR SALE — Precise model 111 Gm and Em tube tester. Latest model just wired from kit, in perfect cond., R. S. Krebs, 1739 E. Susquehanna St., Allentown 60, Pa.

SELL OR SWAP — Like new Triplett 3434A; Westinghouse 6 v. -600 v. 175 ma. dynamotor, $15; Heath AG7 sine/square wave gen. and 1M1 distortion analyzer. Want communications rcvr., Viking 11 or Ranger. H. E. Housholder, 1627 Emerson, Beloit, Wis.

WANTED — Recording oscillograph (Edin, Brush, etc.) single or dual channel. State cond., paper speeds, pen sensitivity, response, and mechanical resonance. W. L. Morgan, 818 Stiles Ave., Maple Shade, N. J.

WANTED — DY-11, DY-17, Navy type 23333 or other dynamotor for ART-13 or ATC-1 with control unit C-87 or 23330 and TM. W. H. Bauer, 119 North Birchwood Ave., Louisville 6, Ky.

FOR SALE — Radio and TV tubes, test equip., books, parts, 2 Radio Engineering courses, NRI Radio course collectors item, old radio and charger, some equip. ment never used. Reasonable. George B. Martin, Box 111, Campbell Hall, N. Y.

FOR SALE — Hickok 209A, PR30, 620, 600A; CRT tester; Sprague T03; Transvision field strength meter; Sam's binders, Oct., 1949 to 216. Royal Craft, Madison Lake, Minn.

TRADE — Remington Sportsman 16 gauge automatic shotgun, 1. n., for good amateur rcvr. Prefer Hallicrafters. J. W. Bleau, Jr., Meadow Creek, W. Va.

SELL OR TRADE — Zenith Transoceanic portable for 16 mm. movie equip. Local only. George Galitsis, 22-31 26th St., Astoria, N. Y.

WANTED — SX42 or SX43. Cash or swap Hickok 156 traceometer, Hickok 1-177 tube checker, Solar CF Exameter, Sutco UHF converter VHF booster, 15" Jenson speaker. C. F. Albertoni, 2629 Paxton Ave., Akron 12, Ohio.

SELL OR SWAP — Motorola T69-20 mobile 25 watt AM transmitter with power supply, control head, cables, in good cond., $25, or swap for outboard motor. Thomas Korn, 3246 North Orange, Chicago 34, Ill.

FOR SALE — Regency HF-350A and HF-350P amplifier and pre-amp., 30 w. output, $108. Pre-amp. housed in blond wood cabinet, contains equalizer and separate bass and treble controls. Wilfred Graham, 610 Latham Dr., Wynnewood, Pa.

WANT — B & W Turn Counter dial. F. W. Jones, Gabbs, Nev.

FOR SALE — Tape recorder, Brush Soundmirror BK-411-U, exc. cond. with three speeds, 3¾, 7½, 15", $90. Want CW3 or F3 Wilcox receivers, type 113A; also manual TM 11-853. F. E. Miller, 3122 SE. 73rd Ave., Portland 6, Ore.

FOR SALE — 10B SSB exciter, QT-1, 75/20 meter VFO, $160; Argus C4 camera, case, flash, $70; DW-68 light meter, $18.50, TDC Mainliner 300 slide proj., $42.50. All excellent. Marcel Valois, Box 488, Covington, La.

FOR SALE — 15 RCA T-100 cabinets. Make offer. American Television Laboratories of California, 214 North Western Ave., Los Angeles 4, Calif.

FOR SALE — Liquidating service business: Sams folders 1 to 291; Riders, abridged 1 to 5 and 6 to 14; Riders television manual, Vol. 1; test instruments. Make offer! Austin Stuart, Inc., 4328 Grace Ave., New York 66, N. Y.

FOR SALE — Speech amplifier and modulation transformer for ART-13, $10 each. William E. Buffington, Box 2, Munford, Tenn.

FOR SALE — Sylvania 131 oscilloscope, $22.50; Eico: 221 volt-ohm meter, $20, 950A Res.-Cap. Bridge $12, 625 tube tester, $23; KT-1 Sprague Cap. checker, $22. Leo J. Sprenkle, 1605 E. Morris St., Wichita 9, Kan.

FOR SALE — FM monitor FD-9B modulation and deviation meter, made by Doolittle Radio, Inc. Price $150 FOB. Nashua Mike and Key Club, Inc., PO Box 94, Nashua, New Hampshire.

TRADE — Assortment of Westinghouse TV schematics and service notes, each for 25 Raleigh Coupons or what have you. Selcraft, Box 394, Spring Valley, N. Y.

SELL OR SWAP — Tubes, radio-TV parts, fuses, etc. Swap for Superior TC-55 tube tester. Vincent Malack, 10530 Edbrooke Ave., Chicago 28, Ill.

SWAP — Kodak Retina f2 Schnieder Xenar coupled range finder, leather case, 4 different filters, for 5" operating scope, prefer Heathkit or other test equip. Jens Gronvald, 2 Park Vale, Brookline 46, Mass.

WANTED — FM tuners, incl. cabinet, in good working cond., GE, Meissner, Pilotuner or Howard. Submit price and complete details. P. S. Carter, 50 Quincy St., Sharon, Mass.

WANTED — Tape recorder, state price and cond. Arnold I. Bernstein, 125 West 228th St., New York, 63, N. Y.

FOR SALE — RCA AVT-112A transmitter, $50. H. Rowland, Rowland Ship-Shore Radiophone Service, RFD 1, Waterford, Conn.

WANTED — WE-23A desk stand, 8B baffle, 9A swivel for 633A salt shaker mike. Robert Cobaugh, 29-29 213 St., Bayside 60, N. Y.

FOR SALE — Dynamotor Pioneer GE motor model 527 rated at 600 v., 150 ma., 6 v. input, postpaid $6. Wm. H. Martin, Fife Rd., R. 2, Bridgeville, Pa.

FOR SALE — Magnavox 10" TV less cash; Clough-Brengle sig. gen.; Philco sig. gen.; Masco TV booster, all working, $50 for all. Ellison Radio Service, Centertown, Ky.

WANTED — Copy of tape recording magazine Vol. I, No. 2, Feb., 1954. Must be in perfect cond., reasonable price. John A. McGregor, 4658 W. 83rd Pl., Chicago 29, Ill.

FOR SALE — 16 mm Auricon sound movie camera complete; Webco tape recorder. Fred Simonian, 96 Blossom St., Lynn, Mass.

SELL — RCA type WV-97A voltohmyst complete, $49, l. n. cond., guaranteed. Park Heights TV Service, 216 Slade Ave., Baltimore 8, Md.

SELL OR TRADE — Precision E-400, ES-500 scope; Sylvania 302 polymeter with 30 kv. probe; Sylvania 220 tube checker with CR adapter. Cash or 7" RCA scope, videometer, 209-VTVM, Senco short checker. John Pellock, Washington St., Bunkerhill, Ill.

FOR SALE — Communications all-band rcvr., Hallicrafter SX-71 used but in A-1 cond., exc. for DX work, $179.50 with instruction book. L. J. Schnedorff, 610 Monroe Ave., River Forest, Ill.

FOR SALE — Meissner 8C FM tuner and Kodak reflex 1A. Joseph Blumenstein, 274 Hawthorne Ave., Yonkers 5, N. Y.

WANTED — TS-175/U frequency meter. State cond. and price. John Christy, 14553 Dickens St., Sherman Oaks, Calif.

WANTED — Set of coils for HRO 50 T1, AC, 21.0-25.0 mc., for cash. J. Andrasko, 223 E. 96th St., New York 28, N. Y.

FOR SALE — RCA BP-10 battery with tubes, as is, $4; Philco auto radio 933 complete, exc. cond. Speaker mounts separate $9. All COD. V. Kozma, 12450 NW 5th Ave., Miami 50, Fla.

SELL OR SWAP — Johnson 122-101 sockets, for 829B, etc., used but clean, 2 for $10.50. V. Johannes, 1541 Metropolitan Ave., Bronx 62, N. Y.

FOR SALE — Brush Hi-Fi crystal headphones, $10; 10M5 hand mike Astatic, $12. C. Stauart, 141 Whiting St., Toledo 9, Ohio.

SWAP — Power supply professionally made with plug for BC 348 rcvr.; complete 20-meter mobile rig self-charging strobe L Meister, 321 River Rd., Nutley, N. J.

FOR SALE — Heath portable tube checker TC-2P with case, l. n., $35. B. Sunshine, 141-40 84th Dr., Jamaica 35, N. Y.

SWAP — Two l. n. RK-65 500 w. output tubes. Want griddip meter, VTVM, oscilloscope, or what have you? R. K. Johnson, 1420 Marguerite, Anniston, Ala.

FOR SALE — NRI communications course with experiment books less kits; 2 binders, $15 plus postage; Heath "Q" multiplier completely assembled, A-1 cond., $7 FOB, cash only. J. W. Eckenwiler, 1664 Betz Dr., Akron 6, Ohio.

FOR SALE — LP 743 Rek-O-Kut transcription table, $40; FM pilot T-601; Ultra linear amplifier TO-300 with reg. power supply and pre-amp., $45. N. McIlwraith, 1374 Argnello Blvd., San Francisco 22, Calif.

WANTED — 80-108 FM set, 152-174 mc. set. Have records, 1 speed player, tubes radio mags. H. Kuell, 18½ Thomas St., Newark 5, N. J.

WANTED — Measurements model 82 sig. gen.; Harmonic distortion analyzer; intermodulation distortion analyzer. L. March, 5615 W. Division St., Chicago, Ill.

WANTED — Heathkit Technical Bulletins (complete) and Sylvania's "How to Service a Radio with an Oscilloscope." George Vella, 1643 La Brosse St., Detroit 16, Mich.

WANTED — 12" color rcvr. RCA, Motorola, or similar brand in fair cond. does not have to be working. Also scope with voltage calibrator. Ed. Tanrath, RR 2, Algonquin, Ill.

FOR SALE — 12 v. mobile xmitter complete, Elmac AF67, dynamotor, starting relay, ant. coax relay, Electrodynamic 600 mike; master mount, whip and coils, 1. n., $175 FOB. M. M. Freedoman, 144-34 72 Dr., Flushing, L. I., N. Y.

WANTED — Triplett or Simpson VOM, State price, condition, and model. Have Fada FM tuner model 795. Will sell or swap for tubes. Sigmund Kordek, 1 Arch St., N. Brookfield, Mass.

SELL OR TRADE — Approve sig. gen. A200, $18; Eico 360K sweep gen., $20; Triplett vibrator tester, $15; Triplett sweep gen. 3434A, $170; Riders 1-14 exc., $55; Browning Md-25 FM-3 band modulation and deviation meter monitor perfect. John Graham, 68 Wurtsboro, N. Y.

SELL — NC183 and Selectojet, $160; Lysco 600, $65; TV chassis parts, $2 to $7 each; BC-453 and AC power supply, $20. C. D. Justis, 315 First Ave., Newport, Del.

FOR SALE — 17" Firestone TV model 13-G-165 top controls; 10" Motorola TV VT107; Sprague Kwik-Test KT-1; RCA color course, all in exc. cond. Make offer. R. McKay, 32052 Brush, Royal Oak, Mich.

FOR SALE — Brush model BK401 tape recorder, exc. cond, was $265, sell $120 with tape. R. N. Eubank, 1227 Windsor Ave., Box 9231, Richmond 27, Va.

SWAP — Precision E-200 sig. gen. for Heathkit condenser analyzer. S. C. Rothgesser, 2041-59 St., Brooklyn 4, N. Y.

WANTED — Late model Heathkit or Eico 5" scope. Will trade TV service parts. M. J. Thornhill, R. 2, Hoschton, Ga.

FOR SALE — Hickok 288X sig. gen., $70; Supreme tube tester, $15; 55' steel triangular tower, $45; T21/ARC5 converted to 160M, no power supply, $5. Swap late model Collins 75A-2 rcvr. for frequency and deviation measuring equip. Leo Liebl, Medford, Wis.

SELL — Meissner 8C FM tuner, perfect, just realigned, placed in service, guaranteed, $25 prepaid. Jack's Radio & TV, 508-10 Central, Bedford, Iowa.

WANTED — Used plug-in type vacuum tube VOM, good working cond. Lenard Berger, 946 Kelly St., Bronx 59, N. Y.

WANTED — Car radio for 1948 jeep station wagon, in perfect cond., for cash. Don's Fix-It Shop, 1216 Elm St., Decatur, Ind.

FOR SALE — Heathkit O-10 scope (5 mc. bandwidth) completely assembled, guaranteed, $69.50. L. S. Recht, 430 E. 67th St., New York 21, N. Y.

SELL OR SWAP — Portable 51R11 Motorola Radio-Recorder-PA and playback, good cond., 2 speed. G. L. Garvin, Box 694, Osceola, Ind.

WANTED — Old radios BC and ham rcvrs. prior 1928, non electric: Atwater Kent breadboard, Crosley Pup, Tryadyne. Give price and cond. George Haymans, Box 468, Gainesville, Ga.

WANTED — All issues 1945 and 1946 CQ magazines, for cash or trade 4E27's. Jerrold L. Colten, 149 E. Tasher, South Bend 14, Ind.

FOR SALE — Two FM 30 w. base stations, never used, fully licensable, 30-50 mc.; also mobile equivalents. Edward P. York, Box 247, Stonington, Conn.

FOR SALE — Bell 2122B Hi-Fi amplifier, 10 w. output, in exc. cond., $25. Irving Lillien, 2370 Ocean Ave., Brooklyn 29, N. Y.

WANTED — HRO rcvr. complete with bandspread coils. Want bargain only. State model price and condition. Geo. Tate, R. 4, Taylors, S. C.

WANTED — GE CRO-5A 5" or 3A 3" scope; GE VCW-1 condenser and resistor tester, in perfect operating cond. H. J. Sudmeyer, Linkway Store, Russellville, Ark.

FOR SALE — RCA Jr. volt-ohmyst WV77A, very good, $20; RCA amplifier 50 w. A. L. Friel, 151 Chestnut St., Watertown, N. Y.

WANTED — Information concerning alignment procedure for BC-342. State price. J. Wiesemann, 1105 N. 41st St., Philadelphia 4, Pa.

WANTED — 3" TV, need not work. State price. Wilbur Remley, R. 6, Box 370, Decatur, Ill.

SELL OR TRADE — 3¼ x 4¼ Speed Graphic, 4.5 Tessar lens and accesories; 5 x 7 Elwood sp. enlarger, other photo equip. Want good tape recorder; Precision E-200-C sig. gen. Prefer local. Arthur Silver, 878 E. 176th St., New York 60, N. Y.

FOR SALE — 2 GE RPX 046 pickup heads, lo-impedance, 250 millihenries, with diamond styli (.003). Ted Braunstein, 1165 W. Farms Rd., Bronx 59, N. Y.

SELL — Viking Adventurer transmitter, guaranteed perfect working condition, laboratory wired and tested, spare 803, $40 cash. L. Emerson, 24 Brambach Ave., Scarsdale, N. Y.

FOR SALE — Aircraft radio rcvr., Navy model ARB, made by RCA, 95-9050 kc., modified audio output push-pull, 6 or 12v., remote control possible. Used in mobile unit, $25. A. G. Hurd, 8 Boylston Terr., Medford, Mass.

SWAP — Martain 60 outboard motor; Federal f4.5 enlarger; RCP tube checker and multimeter; 12" Crosley TV, plus cash for Boonton "Q" meter; Marconi Universal Bridge. Nassau Electronics Co., 204 Dean St., Valley Stream, N. Y.

SWAP — Auto dual air horns with tank and fittings in orignal carton, for late model 17" or up TV or what have you? Eddie's Cadillac Service, 159 N. 6th St., Newark 7, N. J.

FOR SALE — Roll Chart; 504-B Supreme set tester; 640 Jackson test oscillator; Riders Vol. 1 thru 15, practically new. $150. Delivered. C. T. Parker, Hampton Radio & TV Service, Hampton, Ark.

SELL — UHF converter, Mallory TV-101, $15; GE voltage stabilizer, 115 v., 30 VA, never used, $5; miniature camera, Micro 16, $7. R. H. Rogers, 28 Bellamy St., Boston 35, Mass.

SWAP — Beautiful 10, 12½, 17" TV sets (consoles and table models), for VTVM, sig. tracer, scope, or other shop equip. Hillcrest TV Servicecenter, E. Chatham, N. Y.

FOR SALE — Old-time Edison home phonograph for cylinder records and several hundred records. A. Schmehl, 358 East 138th St., New York 54, N. Y.

WANTED — Raytheon portable TV model 7DX22P with 7JP4 picture tube, working or not, with all parts, and reasonable. Robles TV-Radio Service, San Antonio 7, Tex.

FOR SALE — Espey Hi-Fi chassis AM-FM including amplifier and preamplifier with GE 12" speaker and wall baffle, all $60. Used for store music; A-1 shape. Tompkins Square Radio Co., 117 E. 7th St., New York 9, N. Y.

SELL OR SWAP — BC-454-B rcvr. and BC-457-A xmitter. Want Pentron PRE-7 preamp, or Pentron 9T3 amplifier. E. W. Radtke, 25 S. Hawthorne St., Manchester, Conn.

SWAP — 63 Bliley crystals for juke boxes: 19 RED-128704-47361; 17 RED-128614-45871; 5 BLUE-128651-M.C.5; 12 BLUE-128640-45872; 9 YELLOW-128702-M.C.-5 and 1 YELLOW-128621-45873, for B-flat Boehm clarinet. R. W. Landry, 2524 Frenchman St., New Orleans, La.

FOR SALE — Viking Ranger with tubes and manuals, best offer over $175; Turner 34X mike with push-to-talk stand, $10; l. n. NC-88, $85; misc. test equip., surplus units and components. Bill Welsh, 1228 Cambridge St., Cambridge 39, Mass.

SELL OR TRADE — '42-'48 Plymouth radio, $7.50; '39 Chev. radio, $8; Supreme radio course book, $2; Remington elec. shaver, $10. Want guns. R. Chappell, 472 Elm St., Biddeford, Maine.

SELL OR TRADE — Voltohmmeter and current leak indicator, good cond., $20; Hanovia sun ray and therapeutic lamp, home type, $40 or trade for up-to-date tape recorder. Local preferred. Joseph Baruch, 207 Ross St., Brooklyn 11, N. Y.

SELL OR TRADE — Pilotuner FM, $17. Have never played LP albums Dixie and modern to trade for xmitter, rcvng. parts, tubes, TV tuner. R. P. Anderson, 6018 W. Henderson St., Chicago 34, Ill.

FOR SALE — PYE (England) Cambridge International 9-tube AC 12 band radio, phono input, l. n., $80, or trade for Winchester 70-270. Tony Kray, Putney, Vt.

WANTED — Police alarm rcvrs., 30-50 mc., and 152-174 mc., with squelch circuit. Have test kits to trade. N. M. Griffin, 324 Center St., Ithaca, N. Y.

FOR SALE — Riders Manuals 1-16; Rider chanalyst; Philco sig. gen. and tube checker; Clough-Brengle output meter; Multi-tester voltmeter; Hickok ammeter Model 481. Reasonable. Mrs. Robert Wells, Elizabethtown, N. Y.

TRADE — AN/PRS1 mine locator; Precision EV10S VTVM; PE94 dynamotor; BC-221AA, SCR522, BC-196, BC-659H, 55W mod. xformer; Bud coils. Want 4X150A sockets, tape recorder. E. Wright, 2319 E. Indianola, Phoenix, Ariz.

SELL OR TRADE — Popular Mechanics R-422 3-tube shortwave and Standard broadcast rcvr., $12. Need 2AP1 cathode ray tube in good cond. Wayne M. Thomas, 37 Dickinson Ave., Trenton 9, N. J.

WANT — To buy, loan, or rent the schematic and/or Tech. manual for GP-7 xmitter CAY-52173-A. Harold R. Cooper, 63 Terrace St., Park Ridge, N. J.

FOR SALE — Collins 32-V1 xmitter, exc. cond., low-pass filter attached, similar to Bud-type, $350 FOB Pittsfield. P. J. Romano, Baker St., Lanesboro, Mass.

FOR SALE — Motorola 7" TV, $18; Philco 10" TV, $25. H. Bell, 3917 Ely Ave., New York 66, N. Y.

FOR SALE — 4 vols. RCA Service Data; Philco Service Manuals; 9 vols. Beitman's; 6 vols. Riders; Heathkit TV sweep gen. with 3 extra tubes. Make offer. Charles H. Schulz, Jr., 5602 Belle Vista Ave., Baltimore 6, Md.

FOR SALE — Feiler stethoscope; RMS bar gen.; Philco 7052 dynamic mutual conductance tube checker; Hickok 125 VTVM. All perfect, send for prices. Bud's Radio & TV Service, 5912 Hampton Ave., St. Louis, Mo.

FOR SALE — Heathkit V7 VTVM with HV probe, $30; Heathkit SG-8 sig. gen., $15. E. L. Giroux, 735 Park Ave., Hoboken, N. J.

WANTED — Cooke slide rule or KE Log Log decitrig slide rule. Cash or equip. O. Marder, 64 Lafayette Ave., Maywood, N. J.

WANTED — To contact anyone interested in corresponding by tape and exchanging Hi-Fi music tapes. Roger R. Murray, 21 Arbuelo Way, Los Altos, Calif.

SELL OR TRADE — Used 16TP4 glass rectangular pix tube, exc. cond. Want 7" TV pix tube (used), 931-A tube, or what have you? Lee Larson, 379 E. Breckenridge, Ferndale 20, Mich.

WANTED — By disabled Vet, trying to learn radio repair, anything in test equip. and lessons. Must be in working order and reasonable. H. Eldridge, 127 S. Berendo St., Los Angeles 4, Calif.

FOR SALE — Aluminum panels, un-drilled, un-painted. Ken Palmer, R. 2, N. Collins, N. Y.

SWAP — Riders manuals 1 to 5 abridged and 10, 11, 12, for modern tube tester, or some combination of the following: sig. gen., voltmeter, sig. tracer, bridge, decade, multimeter. Martin Feldman, 265 Cabrini Blvd., New York 40, N. Y.

FOR SALE — Riders 1-4 to 13 incl.; other Riders books. No reasonable offer refused. W. E. Menehan, 7416-5th Ave., North Bergen, N. J.

SELL OR SWAP — 12½" TV set for what have you? H. Blackman, 8333 Drexel, Chicago, Ill.

FOR SALE — 5,500 Ft. of turboflex high voltage tubing, ideal for high voltage spaghetti. Send for sample or make offer. D. Crystal, 771 Melrose Ave., Bronx, N. Y.

SELL OR TRADE — Old prewar xmitter and rcvr. tubes; GE Precision lamp for optical devices. Ralph Miller, 7 Lorne St., Dorchester 24, Mass.

WANTED — National HRO, NC183; Hallicrafter SX71 communication rcvr.; Johnson Viking 2 xmitter. State price and cond. Ray Coawette, 2154 Williams St., St. Paul 3, Minn.

FOR SALE — Sams Folder Sets. Send for list and prices. Raymond Conover, Stone Ridge, N. Y.

SELL OR TRADE — Karr PTS-22X mobile 50 w. xmitter, 75 meters, 6 v. dynamotor, antenna relay, modulator, instant heating tubes, shock-proof case. Mount in car trunk, good working order, $50 or what? Farmer Nursery, 3113 N. Columbia St., Plainview, Tex.

FOR SALE — Riders Manuals 11-15, $40; Stancor 6 v. power pack, model 752, $20; Hickok CRT test adapter, $5; UHF Regency converter RC53, $12.50. All perfect cond. C. Thomas, 7420 Rudsdale St., Oakland 21, Calif.

WANTED — Tape or wire recorder for cash or will trade for Superior 1230 sig. gen. or 1948 Dodge radio. Schneider, 9409 Ave. A, Brooklyn 36, N. Y.

WANTED — Monitoradio (AC/DC) rcvr. covering aircraft band 108-136 mc. Must be in good cond. Will pay cash. William H. Weinerth, 4211 4th Ave., Temple, Pa.

FOR SALE — Sig. gen., 2 tubes and rect., 7-15 mc., ver. dial, good shape, $10. L. Matushefske, 2 Elmont Rd., Elmont, L. I., N. Y.

FOR SALE — 1955 model Hallicrafters S38D rcvr., four tubes plus rectifier, l. n., $40. John A. Kerin, 1250 Perrot St., Green Bay, Wis.

FOR SALE — 93 issues Radio-Craft and Radio-Electronics, Apr. 1946-Dec. 1953; 36 Radio News and Radio & TV News, Nov. 1950-Oct. 1953; 12 issues QST, Jan. 1953-Dec. 1953, $15 plus post. P. G. Bedrosian, 8 Fruit St., Newburyport, Mass.

FOR SALE — 6 v. input dynamotor mobile power supply. Output-400 v. at 375 ma. Mounted on chassis with relays and filtering network. Also 120 v. vibrator power supply with filtering, $25. Ray Wilson, 437 Main St., Souderton, Pa.

SELL OR TRADE — Two ATR inverters, input 32 v. DC output 110 v. AC, 50-60 cycles 200 w. intermittent, 100 w. continuous. Want National NC57M rcvr. Walter R. Langhofer, Box 86, Plains, Kan.

FOR SALE — 150 w. phone and CW BC-191 xmitter with 4 1. n. 211 tubes, $100; 1,000 v. DC, 350 ma. gen., $50. Gerald Lorentz, 577 S. Twelfth St., Newark 3, N. J.

FOR SALE — TS-2 Heath TV alignment gen. in perfect cond., $25. Eric Leaf, Ansonia, Ohio.

WANTED — TV sets, any size, not in working cond. Picture tube must be in usable cond. State price, model, and size. John Dallmann, 1839 N. 69th St., Wauwatosa 13, Wis.

SELL OR TRADE — .30-.30 Winchester rifle model 94 in very good cond. and approx. 25 rounds of 150 and 170 grain hollow point ammo., for cash or ham gear. C. W. Edwards, 1002 Kerr Drive, Aiken, S. C.

WANTED — Modern dial telephone. Will trade Bud cabineted 40-80 meter 40 w. CW xmitter with National coils, cabling, 6AG7-807, Triplett meter; exc. cond., 2 power supplies. Duboy, 3100 Brighton 2nd St., Brooklyn, N. Y.

FOR SALE — Delco power plant, gasoline, 1,000 w., 24-44 v. DC, almost new, complete, $35. A. P. Moritz, 174 Harrison Ave., Montclair, N. J.

WANTED — Craftsman TV set 202 model. Otto DeAngelo, Box 182, Reynoldsville, Pa.

WANTED — Old rcvrs., catalogs, rotary gaps before 1924 (DeForest, Paragon, Grebe, Monroe, Mignon, Wireless Spec., Marconi, etc.). Will pay up to $20 plus express for rcvrs. State make, model, cond. F. Donahue, 13855 Roscoe Blvd., Panorama City, Calif.

SELL — Heathkit unused SG-8, wired and tested, $22 FOB. Pick up from factory, wire and air test your DX-100 xmitter, $40. George Pierce, 1447 Grant Ave., St. Joseph, Mich.

SELL OR SWAP — Riders vols. 1-17, for Hi-Fi equip. or what have you? No reasonable offer refused. Dale K. Mark, 16568 Prairie, Detroit 21, Mich.

FOR SALE — TV test equip.; Oak Ridge tube tester, multimeter and bar gen., in maple carrying case, used only few times, $70 for the lot! J. M. Kilroy, 315½ Temple Ave., Long Beach 14, Calif.

SWAP — Heathkit 0-9 scope, exc. cond., for Heathkit W-4 amplifier and WA-P2 preamp, assembled or unassembled, if complete. James R. Wilson, 135 Saranac St., Rochester 8, N. Y.

SELL — Unused B & W CX-58-B butterfly condenser for IKW final, $12; 8.8 Henry 600 ma. filter choke from BC-610; 210 feet unused RG 8/0, $10; 250TH's, $10; 810's, $5; 805's, $2; 100TH, $5. Macy, 2346 Dundee, Louisville 5, Ky.

SELL OR SWAP — Weston DC ammeter 0-3A and 0-1.5A; Flechtheim voltmeter 0-300 v. DC; 3¼" x 4" Lantern slide projector. A. Schrier, 38 W. 182nd St., Bronx 53, New York, N. Y.

FOR SALE — 5-vol. set Applied Practical Radio-TV, exc. cond., $12; Better TV Reception in Fringe and Low Signal Areas, 2nd ed., $1. E. L. Williams, 1521 N. 6th Pl., Milwaukee 12, Wis.

WANTED — McMurdo Silver Masterpiece VI rcvr. H. Christ, RR 1, Metamora, Ill.

WANT — Low-priced test equip. State model, age, cond., and lowest cash price. R. B. Johnson, 3922 W. 108 St., Inglewood, Calif.

FOR SALE — Nine Photofact binders, best offer over $1 each; unused Coradio, coin-operated (2 hrs. for 25c), metal case and stand, 6-tube, list $85, best offer. Brown's TV Service, Coloma, Mich.

WANTED — Measurements Grid Dip meter in good cond. P. Boothnay, Box 142-G, Sparta, N. J.

SELL OR TRADE — Radio rcvrs., radio-phonograph combinations, equip., publications dating from 1919 through 1927, for Cord car. Howard C. Bergstrom, 1717 South 29th St., Omaha 5, Neb.

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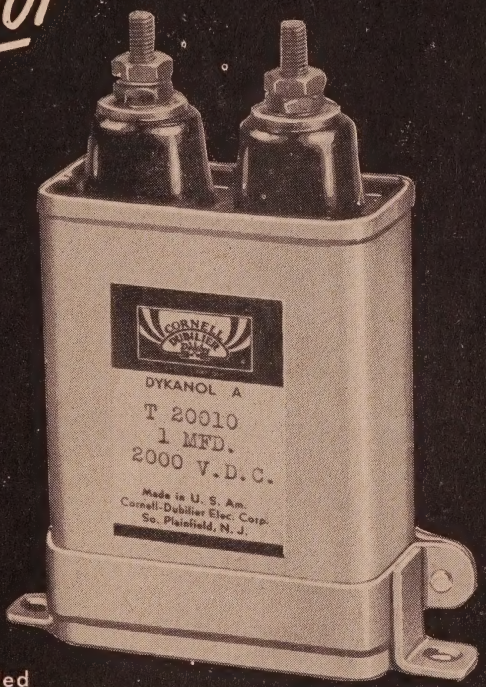

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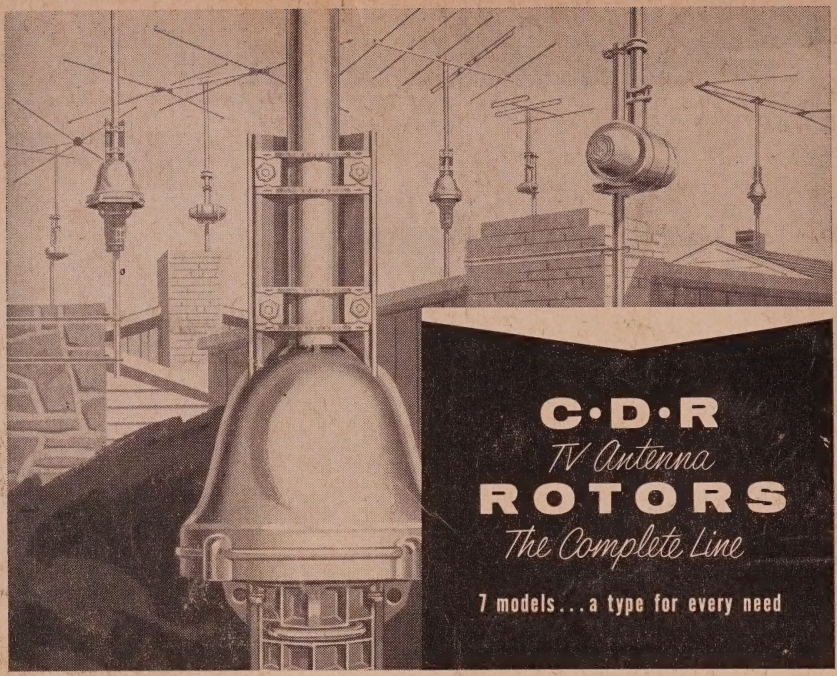

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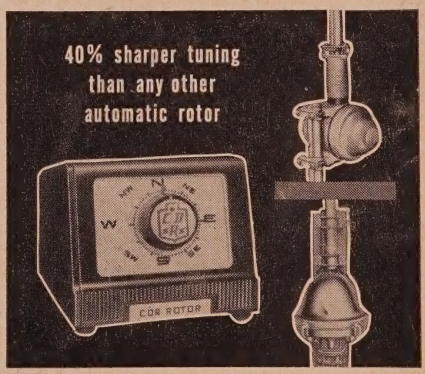

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